Certificate

I, Andrew Davis, c/o Patent Attorneys Lippert, Stachow, Schmidt & Partners, Frankenforster Strasse 135-137, D-51427 Bergisch Gladbach, Federal Republic of Germany, do solemnly and sincerely declare that I am conversant with the English and German languages and am a competent translator thereof, and that the following is a true and correct translation into the English language of the new US Patent Application of Frank Schlieber et al. (Montaplast GmbH), filed on December 13, 2000.

Declared at Frankenforster Strasse 135-137
in D-51427 Bergisch Gladbach,
Federal Republic of Germany,
this 14th day of February 2001.

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(Andrew Davis)

Deutsches Patent- und Markenamt

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Prüfungsantrag, wirksam gestellt am 13. Dezember 1999

Eingabe vom **eingegangen am**

Die weitere Prüfung der oben genannten Patentanmeldung hat zu dem nachstehenden Ergebnis geführt.

Zur Äußerung wird eine Frist

von vier Monaten

gewährt, die mit der Zustellung beginnt.

Für Unterlagen, die der Äußerung gegebenenfalls beigefügt werden (z.B. Patentansprüche, Beschreibung, Beschreibungsteile, Zeichnungen), sind je **zwei** Ausfertigungen auf gesonderten Blättern erforderlich. Die Äußerung selbst wird nur in einfacher Ausfertigung benötigt.

Werden die Patentansprüche, die Beschreibung oder die Zeichnungen im Laufe des Verfahrens geändert, so hat der Anmelder, sofern die Änderungen nicht vom Deutschen Patent- und Markenamt vorgeschlagen sind, im einzelnen anzugeben, an welcher Stelle die in den neuen Unterlagen beschriebenen Erfindungsmerkmale in den ursprünglichen Unterlagen offenbart sind.

☒ In diesem Bescheid sind folgende Entgegenhaltungen erstmalig genannt. (Bei deren Numerierung gilt diese auch für das weitere Verfahren):

Hinweis auf die Möglichkeit der Gebrauchsmusterabzweigung

Der Anmelder einer nach dem 1. Januar 1987 mit Wirkung für die Bundesrepublik Deutschland eingereichten Patentanmeldung kann eine Gebrauchsmusteranmeldung, die den gleichen Gegenstand betrifft, einreichen und gleichzeitig den Anmeldetag der früheren Patentanmeldung in Anspruch nehmen. Diese Abzweigung (§ 5 Gebrauchsmustergesetz) ist bis zum Ablauf von 2 Monaten nach dem Ende des Monats möglich, in dem die Patentanmeldung durch rechtskräftige Zurückweisung, freiwillige Rücknahme oder Rücknahmefiktion erledigt, ein Einspruchsverfahren abgeschlossen oder - im Falle der Erteilung des Patents - die Frist für die Beschwerde gegen den Erteilungsbeschluß fruchtlos verstrichen ist. Ausführliche Informationen über die Erfordernisse einer Gebrauchsmusteranmeldung, einschließlich der Abzweigung, enthält das Merkblatt für Gebrauchsmusteranmelder (G 6181), welches kostenlos beim Patent- und Markenamt und den Patentinformationszentren erhältlich ist.

/1/ DE 19729780 C1, Sp. 4, Z. 64 bis Sp. 5, Z. 3, B29C45/14 B
/2/ DE 4480112 C2, Sp. 7, Z. 39 bis Sp. 8, Z. 9, Fig. 3, B29C 45/14 B

Aus /1/ ist es bekannt, Folien in einem separaten Werkzeug mittels Vakuum tiefzuziehen und anschließend diese Vorformlinge in ein Spritzgußwerkzeug zu überführen und zu hinterspritzen. Aus /1/ ist weiterhin bekannt, gasdurchlässige Dekormaterialien die mit Folie oder einem porösem Vlies beschichtet sind im Spritzgießwerkzeug selbst zu formen und dann zu hinterspritzen. Auch in /2/ wird das Formen und Hinterspritzen von Textilzuschnitten im Spritzgießwerkzeug beschrieben.
Bei diesem Stand der Technik kann die zum Patentschutz notwendige erfinderische Tätigkeit nicht zuerkannt werden.

Der Patentanspuch 1 ist daher nicht gewährbar.

Nachdem der Hauptanspruch nicht gewährbar ist, sind die auf ihn rückbezogenen Patentansprüche 2 bis 4 ebenfalls nicht gewährbar. Es handelt sich hierbei um Unteransprüche deren Gewährbarkeit die des Hauptanspruches voraussetzt.

Der Patentanspruch 5 ist auf ein Textil zum Kaschieren und dauerhaften Verbinden mit einem Innenausstattungsteil aus Kunststoff gerichtet. Es handelt sich hierbei um einen den vorangegangenen Patentansprüchen nebengeordneten Patentanspruch. Sein Gegenstand muß sämtliche Voraussetzungen der Patenfähigkeit erfüllen.

In /1/, Sp. 3, Z. 9 bis 46 wird z. B. Dekormaterialien, die mit Vliesen belegt sind, mehrschichtige Stoffgewebe sowie mit Folie beschichtetes Dekormaterial hinterspritzt. In /2/, Sp. 7, Z. 39 - 48 wird ein Schichtstoff aus z. B. gewebten textilem Stoff und Film hinterspritzt. Unter Berücksichtigung von /1/ und /2/ erscheinen deshalb die Merkmale der Patentansprüche 5 und 6 für den Fachmann naheliegend.

Bei dieser Sachlage kann die Erteilung eines Patentes nicht in Aussicht gestellt werden.

Falls auf diesen Bescheid eine Äußerung in der Sache nicht beabsichtigt ist, wird um eine formlose Mitteilung über den Erhalt des Bescheids gebeten.

Prüfungsstelle für Klasse B 29 C
Dipl.-Ing. Röthe
Hausruf: 4541

Anlage: zweifache Ablichtung der Entgegenhaltungen /1/ und /2/

DEUTSCHES PATENT- UND MARKENAMT 54

Ausgefertigt

Regierungsangestellte

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Manufacturing process for a plastic injection moulding laminated with a textile fabric, a non-woven or the like

The invention relates to a manufacturing process for a plastic injection moulding laminated with a textile fabric, a non-woven or the like, and a textile fabric, a non-woven or the like for laminating and permanent joining to a piece of plastic interior trim of any shape, particularly for the automotive sector.

Polyester or blended fabrics are preferably used as the textile fabrics and permanently applied to the injection moulding as cladding. These materials are usually textile fabrics laminated with a non-woven. It is known from the prior art that these laminated textile fabrics are initially cut to size and the blank then placed inside the injection mould. In order to obtain a wrinkle-free surface, the fabric must be tension-mounted inside the injection mould. This is preferably achieved using a pneumatically actuated clamp system. After tension-mounting the fabric - a relatively time-consuming process - a backing is then injection moulded onto it. After the injection process ends, the semi-finished workpiece, such as a column trim panel for the passenger car sector, is ejected and conveyed to the trimming station. In the trimming station, the fabric protruding over the edge of the workpiece must be trimmed in order to obtain the finished workpiece.

The workpieces are generally of three-dimensional geometry, meaning that the edge contour is also three-dimensional. According to the prior art, trimming requires an article-speci-

fic trimming cell, which can process the respective edge contour of the workpiece. The throughput time of an individual workpiece is decisively dependent on the operating speed of the injection moulding machine, as this is usually the bottleneck in the manufacturing process.

The invention is based on the technical problem of further developing a generic manufacturing process such that the throughput times are reduced.

According to the invention, the object is solved in that the manufacturing process comprises the following steps:

- Preforming of a fabric blank, which is coated on a first side facing the injection moulding with a plastic film that is thermoformable and, when cooled, dimensionally stable and elastic, into the desired outer contour of the injection moulding to be manufactured.
- Insertion of the preformed fabric blank into the injection mould,
- Injection-backing of the fabric blank with plastic, and
- Ejection of the laminated injection moulding.

Prior to the start of the actual injection moulding process, the fabric blanks are consequently already given the prefabricated contour they need to cover the finished injection moulding. In contrast to the prior art, a first side of the fabric on the inside of the finished product is provided with a thermoformable plastic. In the first process step, the fabric blank is thermoformed in a corresponding mould, in order to obtain the desired outer contour of the later injection moulding. This plastic is dimensionally stable after cooling. At the same time, however, it is still so elastic that a bend can be formed with the fabric on the workpiece.

Contour trimming can be carried out after the preformed textile blanks cool. This can be done by an automatic machine, such as an articulated robot. This makes it possible to realise the three-dimensional contour trimming of the edge profile that is

particularly common on interior trim in the automotive sector and cannot be realised with the simple thermoforming process step alone; in the case of thermoforming, trimming can only achieve a two-dimensional edge cut.

After contour trimming, the preformed fabric is inserted into the injection mould. The plastic film is impermeable to air, meaning that the fabric can also be handled from the fabric side by the suction grippers usually used in injection moulds, in order to be inserted into the injection mould or removed it from it. Thus, the usual automatic machines or robots can be used for handling in the process according to the invention without refitting.

The preformed fabric is injection-backed with plastic in the injection mould in the familiar manner. During injection moulding, the injected plastic is permanently joined to the plastic film already provided on the fabric.

After injection moulding, the laminated workpiece is removed from the injection mould and ejected. Accordingly, no further trimming of the workpiece is required. This initially makes continuous manufacturing possible, as the process is no longer dependent on the cycle times of the injection mould. In addition, article-specific trimming cells are unnecessary, this substantially reducing the space required for the manufacturing process. Furthermore, the fabric blanks are easy to handle, thus making it possible to realise far higher capacity utilisation.

The preformed fabric blank is preferably first cut to fit the outer contour of the finished workpiece. This can be carried out by a trimming robot, for example. The article-specific trimming cells of the prior art thus become obsolete. The trimming robots can carry out any required trimming.

According to the invention, the plastic film is made of materials that can be joined particularly well with the plastic to

be injected later on. Thermoplastic olefins, variants thereof, or thermoplastic urethanes are preferred for use.

Alternatively, the surface of the film facing the fabric can also be coated with an activator that permanently joins the fabric to the injected plastic and also simplifies and accelerates the joining process.

The thickness of the laminated fabric is usually about 5 mm and that of the plastic film about 2 mm. Depending on the application, the latter dimensions can also be thicker if complicated contours have to be reproduced.

An example of the invention is shown in the drawing and described below in detail on the basis of the figures. The figures show the following:

Fig. 1 A schematic top view of the manufacturing process according to the invention, and

Fig. 2 A lateral cross-section of the textile fabric according to the invention.

Figure 1 shows a top view of the manufacturing process according to the invention. According to the drawing, the process essentially consists of two elements, namely thermoforming station 1 and injection moulding station 2.

According to the process according to the invention, laminated fabric 3, which is delivered in prefabricated form and provided with the plastic film on one side, is delivered in rolls and unrolled on thermoforming station 1. A thermoforming device, which is preferably designed as automatic thermoforming machine 4, preforms the fabric into preformed fabric blanks 5.

Trimming robots 6 and 7 cut fabric blanks 5 to the final outer contour they will have on the finished workpiece. In this case, trimming robots 6 and 7 are designed as articulated robots.

The preformed and trimmed preforms are then conveyed to an intermediate buffer 8. The individual fabric blanks 5 are conveyed from this intermediate buffer 8 by another automatic machine, which is preferably designed as a linear robot 9 due to the required precision, to the actual injection moulding process in injection moulding machine 10. After injection moulding, the laminated workpieces are ejected from injection mould 10 by articulated robot 9 and forwarded to assembly.

Figure 2 shows a lateral view of a fabric blank 5 shortly after thermoforming. Thermoforming is carried out in an automatic thermoforming machine 4, which consists in the known fashion of a bottom force 4a and a top force 4b. Heat is applied to the top force and, when bottom force 4a and top force 4b are pressed together, it thermoforms plastic film 5a provided on fabric blank 5.

Plastic film 5a lies on the bottom force. Vacuum ducts 4c are also provided on bottom force 4a. Fabric blank 5 consists of a plastic film 5a lying on bottom force 4a, the underside of which is joined to a textile fabric laminated with a non-woven.

After preforming, fabric blank 5 has a three-dimensional, shell-type shape. The flange-like edge 5c around the outside can either be removed during contour trimming or folded in towards the inside of the finished workpiece, if a workpiece with a fold is to be manufactured.

Manufacturing process for a plastic injection moulding laminated with a textile fabric, a non-woven or the like

List of reference numbers

1	Thermoforming station
2	Injection moulding station
3	Textile fabric
4	Automatic thermoforming machine
4a	Bottom force
4b	Top force
4c	Vacuum ducts
5	Fabric blank
5a	Plastic film
5b	Textile fabric
5c	Edge
6	Trimming robot
7	Trimming robot
8	Intermediate buffer
9	Articulated robot
10	Injection moulding machine

Manufacturing process for a plastic injection moulding laminated with a textile fabric, a non-woven or the like

Patent claims

1. Manufacturing process for a plastic injection moulding laminated with a textile fabric, a non-woven or the like, particularly a piece of interior trim for an automobile, that comprises the following process steps: preforming of a fabric blank, which is coated on a first side facing the injection moulding with a plastic film that is thermoformable and, when cooled, dimensionally stable and elastic, into the desired outer contour of the injection moulding to be manufactured; insertion of the preformed fabric blank into the injection mould; injection-backing of the fabric blank with plastic; ejection of the laminated injection moulding.

2. Manufacturing process as per Claim 1, where preforming is followed by true-to-size contour trimming.

3. Manufacturing process as per Claim 1 or 2, where the workpieces are exclusively handled by automatic machines between the individual process steps.

4. Manufacturing process as per one of Claims 1 to 3, where the edge of the injection moulding has a contour of any shape, even three-dimensional.

5. Textile fabric for laminating and permanent joining to a piece of plastic interior trim of any shape, particularly for the automotive sector, c h a r a c t e r i s e d i n t h a t the fabric is joined on one side to a plastic film (5a) that is thermoformable and, when cooled,

dimensionally stable and elastic.

6. Textile fabric as per Claim 5, c h a r a c t e r i s e d i n t h a t the surface of the plastic film (5a) facing the fabric is coated with an activator that permanently joins the fabric to the plastic to be used for injection-backing.

Manufacturing process for a plastic injection moulding laminated with a textile fabric, a non-woven or the like

Summary

In order to reduce the throughput times of a manufacturing process and the space required for the manufacturing facilities for a plastic injection moulding that is laminated with a textile fabric, a non-woven or the like, particularly a piece of interior trim for an automobile, it is proposed in accordance with the invention that the process comprise the following steps: loading of a fabric blank, which is coated on a first side facing the injection moulding with a plastic film that is thermoformable and, when cooled, dimensionally stable and elastic; preforming of the fabric blank into the desired outer contour of the injection moulding to be manufactured; insertion of the preformed fabric blank into the injection mould; injection-backing of the fabric blank with plastic; ejection of the laminated injection moulding (Fig. 1).